

**TWO NEW SPECIES OF *TORYMOIDES* WALKER (HYMENOPTERA:
TORYMIDAE) FROM THE AMERICAN SOUTHWEST, WITH A KEY TO
NEARCTIC SPECIES**

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Abstract.—Two new species of *Torymoides* are described: *T. comicus* Grissell and *T. tragicus* Grissell. Each is illustrated and a key is given to described Nearctic species. The new species have not been reared, but *T. comicus* may be associated with insects infesting flower heads of Asteraceae or galls on Fabaceae. The new species are reported from Arizona, western Texas, and central Mexico (Michoacán).

Key Words: *Torymoides*, Nearctic species

The comopolitan genus *Torymoides* Walker contains 50 described species of which only eight are known from the New World (Grissell 1995, Noyes 2003, Grissell 2005). Of these, three occur in the Neartic: *T. smithi* (Schread), known from Connecticut and Maryland, *T. sulcius* (Walker), a widespread Neotropical species whose northernmost range includes Florida and Texas; and *T. boucekianus* Grissell known from coast to coast in the southern U.S. The Neotropical species of *Torymoides* (except *T. sulcius*) were all described from Argentina by Kieffer and Jörgensen (1910) as *Lochites* Förster but were transferred to *Torymoides* by Grissell (1995). Since their descriptions, the type material of all of Kieffer and Jörgensen's material has been lost, nothing has been written about them, and none of the species have been recognized. These species are *T. asphondyliarum*, *T. erythromma*, *T. festiva*, *T. swaedicola*, and *T. testacea*.

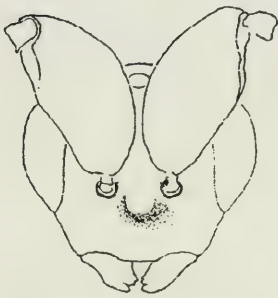
The biology of the genus is poorly known, but in general, species have been reared from gall-forming Cecidomyiidae, Tephritidae, and as yet unknown gall-forming insects (Grissell 1995).

In this paper, I describe a distinctive new species of *Torymoides* commonly found in Arizona and Texas with a single record from central Mexico. A second, less common species is described from Texas. I also update my recent key (Grissell 2005) because of the new species being described herein.

Acronyms used for museums are as follows: CNCI = Canadian National Collection of Insects, Ottawa, Ontario, Canada; TAMU = Texas A & M University, College Station, Texas; UCR = University of California, Riverside, California; USNM = National Museum of Natural History, Washington, DC. Abbreviations used are F_n antennal flagellar segment number; MT_n = metasomal tergum number, ST_n = metasomal sternum number.

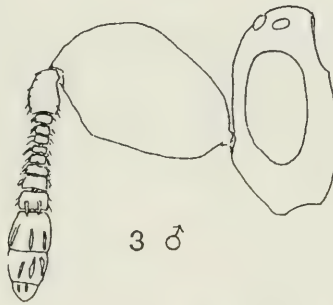


1



2 ♂

Torymoides comicus



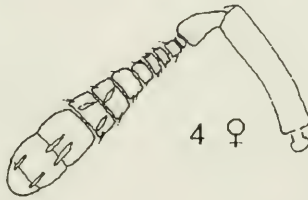
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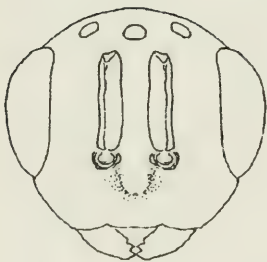
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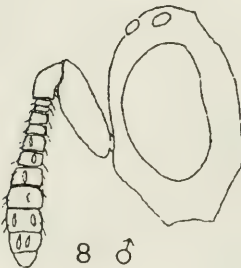


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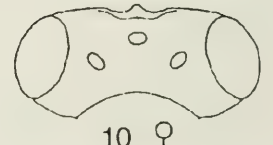


7 ♂

Torymoides tragicus



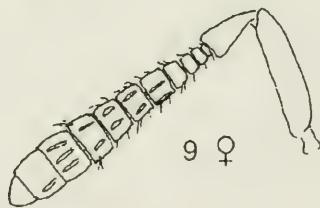
8 ♂



10 ♀



11 ♂



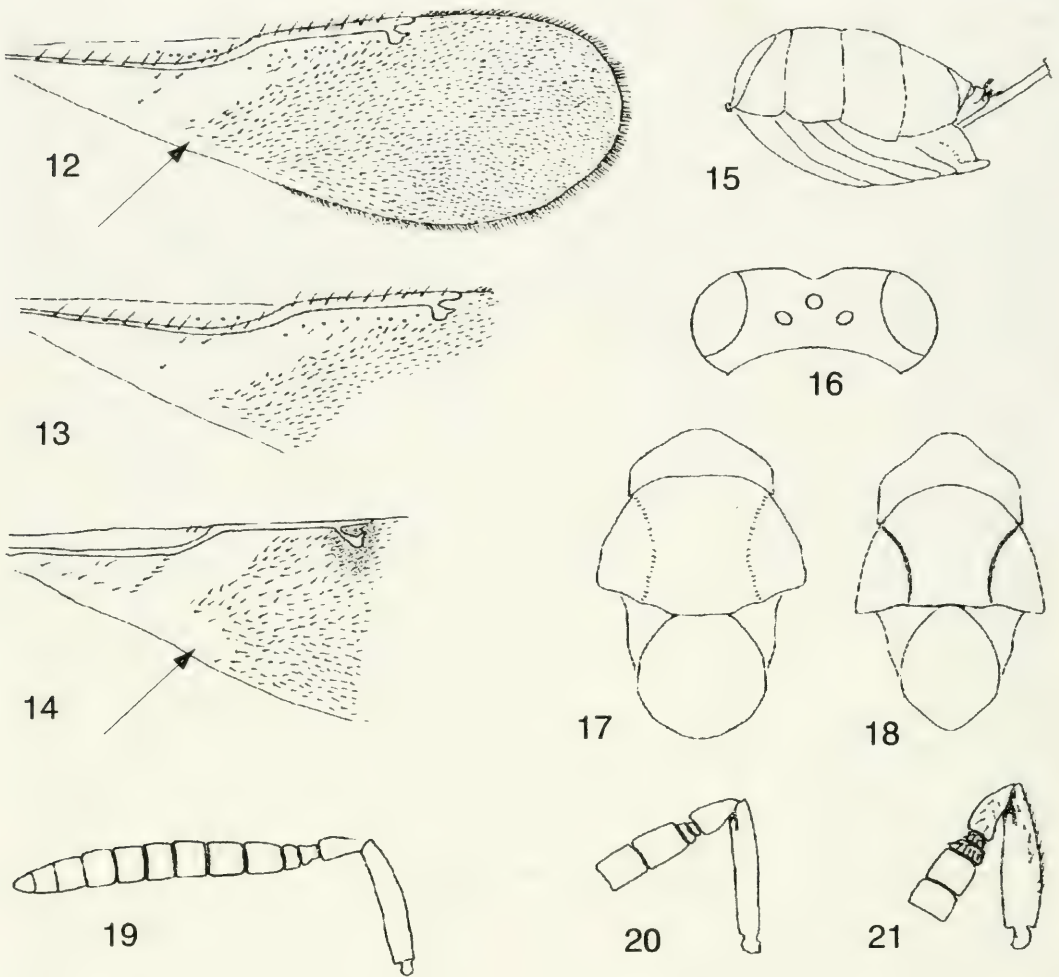
9 ♀

Torymoides comicus Grissell, new species
(Figs. 1–6, 12, 18)

Female holotype.—Body length 2.2 mm; ovipositor sheath about 3.2 mm. Head, antenna, and mesosoma metallic green; femora, tibia (except apices white), and metasoma brown; tarsi, wing veins white. Head (except scapal basin) and dorsum of mesosoma finely reticulately sculptured, except scutellum polished medially and axilla proximally; polished are scapal basin, sides of mesosoma, propodeum, coxae, and sterna; terga barely aciculate. Lower half of face is covered with evenly spaced white setae (equal to length of setae on mesosoma); dorsum of mesosoma with sparse white setae; metacoxa without dorsal setae. *Head*: In dorsal view (Fig. 5) about twice as wide as long; in frontal view wider than high. Intermalar distance about $2.0\times$ malar distance which is about $0.4\times$ eye height. Eyes at narrowest point separated by about $1.2\times$ own height, with inner orbits diverging slightly ventrally. Ratio of lateral ocellus diameter:ocellocular distance:postcellar distance = 1.4:1:2.4 (Fig. 5). Clypeus with apical margin straight, slightly protruding relative to corners of oral fossa. Torulus positioned slightly above ventral eye margin, separated by slightly more than own diameter. Antenna (Fig. 4) with F1–5 anelliform, F6 appears intermediate between anelliform and “normal” (no placoid sensilla present), F7–8 wider than long, each with one or two sensilla (visible) in side view, without rotating specimen); flagellomeres with at least one row of erect setae; dorsum of scape and pedicel with white, semi-erect setae; clava without ventral micropilosity. *Mesosoma*: About $1.7\times$ as long as wide, in profile propodeum sloping at about 45

degrees. Pronotum short, about $3.0\times$ wider than long, without collar and sloping abruptly to occiput (Fig. 1). Scutum with notaulus indicated by distinct groove (Fig. 18). Scutellum about $1.2\times$ longer than wide, moderately convex, without frenal line; scutellar flange narrow (Some pits perceptible at $200\times$); anterior margin nearly pointedly (i.e., axillae nearly touching medially). Propodeal spiracle separated from posterior margin of propodeum by about $3.0\times$ its longest diameter; nucha indiscernible. Metafemur about $6.0\times$ as long as wide; metatibial spur with longer spur subequal in length to apical width of tibia, shorter spur about $0.5\times$ length of longer one. Forewing (Fig. 12) hyaline; coastal cell aetose dorsally, ventrally with setal row (8 setae) in apical third; basal and cubital veins aetose, basal cell aetose; speculum bare dorsally, closed to posterior of wing (Fig. 12—arrow), ventrally without setae; admarginal area sparsely setose dorsally, ventrally distinctly setose; stigmal area aetose; ratio of submarginal vein:marginal vein:postmarginal vein:stigmal vein about 6:5:2:1; stigmal vein distinctly petiolate. *Metasoma* (Fig. 1): Longer than head and mesosoma combined; metasomal tergum 1 (MT1, petiole) scarcely visible as transverse strip; MT2–4 apicomidially emarginated, MT5–6 entire (margins difficult to see because of color, translucency, and distortion); sterna difficult to interpret but ST2 extends to apex of MT2 and hypopygium extends to $0.75\times$ to apex of gaster; ovipositor sheaths slightly longer than body length, about $6\times$ length of metatibia.

Male.—Body length 1.7–2.1 mm. As for female except: intermalar distance about $3\times$ malar distance, which is $0.51\times$ eye height; scape greatly enlarged and



Figs. 12-21. *Torymoides* spp. 12-14, Forewing, setae on upper surface; setae on lower surface not shown except in costal cell and admarginal areas (as dots); arrow indicates position of setal row of cubital and subcubital veins relative to speculum. 12, *T. comicus*. 13, *T. tragicus*. 14, *T. boucekianus*. 15, *T. tragicus*, metasoma. 16, *T. boucekianus*, head, dorsal. 17-18, Mesosoma, dorsal view (excluding propodeum). 17, *T. tragicus*. 18, *T. comicus*. 19-21 Antennae. 19, *T. boucekianus*. 20-21, Antennal scape, pedicel, F1-4. 20, *T. smithi*. 21, *T. sulcius*.

laterally compressed (cf. Fig. 2, 3 male, 4 female); F1-6 (and sometimes F7) anelliform; toruli separated by about $2\times$ own diameter (Figs. 2, 6); metasoma slightly dorsoventrally compressed (somewhat distorted in all specimens), MT1 inconspicuous; MT2-6 slightly emarginated apicomediaally.

Variation.—Females vary in length (excluding ovipositor) from about 1.7-2.5 mm (the majority of specimens are over 2.0 mm). In most females the

ovipositor is greatly curled and is impossible to measure, but in all specimens the ovipositor is obviously much longer than the body. In females, F6 varies from anelliform to nearly "flagellarlike" and lacks placoid sensilla. In males every segment but F8 appears anelliform. Wing setation varies slightly, with the number of ventral setae in the costal cell ranging from about five to eight and sometimes with one or two setae off center from the line (and thus appearing

as possibly two indistinct rows). In general the admarginal area varies from fairly densely setose (Fig. 12) to nearly approaching the condition found in *T. tragicus* (Fig. 13).

Type material.—Holotype ♀, 2 mi E Bisbee, Jct Hwy 80 & Warren Road, 27-VIII-1982, J. LaSalle, screen sweeping (USNM). Paratypes, 157 ♀, 136 ♂, from the following localities. UNITED STATES. Arizona: Cochise Co.: 4 ♀, 4 ♂, 6.8 mi SE Apache, nr. Mouth of Skeleton Cyn., 4,500', 14-VIII-1982, G. A. P. Gibson (CNCI); 105 ♀, 57 ♂, same data as holotype (UCR, USNM); 1 ♂, Dragoon Mountains near Middlemarsh Pass, Hwy. 345, 22-VIII-1993, M. Sharkey (CNCI); 1 ♀, 1 ♂, 2.4 mi E Paradise, 5,300', Chiricahue Mountains, 14-VIII-1982, G. A. P. Gibson (CNCI); 2 ♀, 1 ♂, Rustler Park, Chiricahua Mountains, 26-VIII-1982, J. LaSalle, screen sweeping (UCR); 1 ♀, Sunny Flat Campground, Chiricahua Mountains, 24-VIII-1982, J. LaSalle, screen sweeping (UCR); 1 ♀, Sycamore Canyon, 12 mi W. Montezuma Pass, 1-IX-1991, E. E. Grissell, sweeping oak-juniper savannah (USNM). Pima Co.: 7 ♂, Bog Springs Campground, Madera Canyon, 28-VIII-1982, J. LaSalle, screen sweeping (UCR). Santa Cruz Co.: 1/5 mi NE Nogales, 19-VIII-1991, E. E. Grissell, R. F. Denno (USNM); 3 ♀, 25 ♂, Sycamore Canyon, Hank and Yank Springs, 4,200', 7-8-VIII-1982, G. A. P. Gibson (CNCI); 1 ♀, 11 ♂, 1.0 mi S Pena Blanca Lk, 4,100', 6-XIII-1982, G. A. P. Gibson (CNCI). Texas: Brewster Co.: Big Bend National Park: 1 ♀, 2 ♂ (no locality), 21-VII-1977, L. Masner (CNCI); 3 ♂, Rosillos Mountains, Nine Mile Draw, 10 mi. W Hwy 385, 20°35'N, 103°16'W, 12-IX-1993, E. E. Grissell, R. F. Denno, desert wash (USNM); 1 ♀, Trough Canyon, 29°29'N, 103°8'W, 16-VI-1991, R. Wharton (TAMU); Butrill Spring, 29°30'N, 103°16'W, 4-5-X-1991, R. Wharton (TAMU); 10 ♀, 17 mi SE Alpine, 29-

VIII-1971, E. E. Grissell, R. F. Denno, on *Ratibida columnaris* (USNM). Burnett Co.: 5 ♀, 3 ♂ Inks Lake State Park, 30°38'N, 98°21'W, 22-III-1986, Woolley, Zolnerowich (TAMU). Culberson Co.: 1 ♀, mi NE Nickle, 27-VIII-1991, E. E. Grissell, R. F. Denno, sweeping roadside vegetation (USNM); 7 ♂, 3.6 mi S Pine Springs, old Guadalupe Pass Rd, nr. Guadalupe Springs, 5,200', 20-22-VIII-1982, flowering *Acacia constricta*, G. A. P. Gibson (CNCI). Llano Co.: 2 ♀, 1 ♂, Enchanted Roack, 19-VIII-1988, G. Zolnerowich (TAMU). Presidio Co.: Big Bend Ranch State Natural Area: 1 ♂, 29°30'N, 103°51'W, 9-VIII-1991, G. Zolnerowich (TAMU); 12 ♀, 7 ♂, 2.5 mi W LaSauceda, 29°29'N, 104°1'W, 9-VIII-1991, J. B. Woolley (TAMU); 2 ♀, 2 ♂, Lava Canyon, 29°30'N, 103°50'W, 20-X-1990, G. Zolnerowich (TAMU); 4 ♀, 44 mi SE Presidio, 3-IX-1971, E. E. Grissell, R. F. Denno, on *Sphaeralcea angustifolia* (USNM). MEXICO. Michoacán: 1 ♀, 10 km w. La Piedad, 14-IX-1975, B. Villegas (USNM).

Host.—No specific host is known. The specimens collected by LaSalle (cited above, i.e., Rustler Park, Sunny Flat Campground, Bog Springs Campground, Sycamore Canyon) were "... almost certainly taken sweeping *Mimosa dysocarpa* [Fabaceae]" (LaSalle, personal communication). Galls of *Tanostigmodes yuohuae* LaSalle (Hymenoptera: Tanaostigmatidae) are made on young stems, leaf midribs and flower stalks of this plant and adults of this wasp were collected at all the above localities (LaSalle 1987) along with *T. comicus*. There is also a cecidomyiid gall former associated with buds, thorns, and petioles of *Mimosa* in the southwest (Gagné 1989) and another on leaf bases in Mexico (Gagné, personal communication), and it is possible that one of these is a host. I collected specimens of *Torymoides comicus* on flowers of

Ratibida colummaris [Asteraceae] near Alpine, Texas, and flowers of this plant are also known to contain cecidomyiid galls (Gagné 1989). Because cecidomyiid are a documented host of *Torymoides*, it is likely that *T. comicus* attacks such hosts.

Etymology.—From the latin *comicus*, with reference to the jester-like appearance of the male.

Host.—No host is known for this species but it has been taken in association with *Mimosa dysocarpa* at many of its collection sites (John LaSalle, personal communication).

Distribution.—This species is known from southern Arizona and western Texas. One specimen was collected in central Mexico (Michoacán).

Discussion.—Male *T. comicus* are remarkable among Torymidae by virtue of their greatly enlarged, flattened scapes (Figs. 2–3). Although some species of *Monodontomerus* display modifications of the scape (Grissell 2000), none are as pronounced as this species.

Females are more difficult to distinguish from *T. tragicus*, and detailed characters to separate the two species are given under that species. Additional characters for males are also given.

***Torymoides tragicus* Grissell, new species**
(Figs. 7–11, 13, 15, 17)

Female holotype.—Body length 2.1 mm; ovipositor sheath about 2.7 mm. Body metallic greenish black; scape and legs (excluding tarsi) blackish green; tarsi and wind veins brownish white. Dorsum of head and mesosoma finely reticulately sculptured, lower half of face with irregular punctures each with seta; polished are scapal basin, sides of mesosoma, propodeum, coxae, and sterna; terga transversely aciculate. Lower half of face covered with evenly spaced white setae (equal to length of setae on mesosoma); dorsum of mesosoma cov-

ered with sparse, evenly spaced, white setae, metacoxa without dorsal setae. **Head:** In dorsal view (Fig. 10) over twice as wide as long; in frontal view wider than high. Intermalar distance about $1.5\times$ malar distance, which is about $0.6\times$ eye height. Eyes at narrowest point separated by about $1.1\times$ own height, with inner orbits diverging slightly ventrally. Ratio of lateral ocellus diameter: ocellular distance:postcellar distance = 1:1:3.5. Clypeus with apical margin straight, slightly separated by slightly more than own diameter. Antenna (Fig. 9) with F1–3 anelliform, F4 appears intermediate between anelliform and “normal” (no placoid sensilla present), F5–8 wider than long each with one or two sensilla (visible in side view, without rotating specimen); flagellomeres with at least one row of erect setae; dorsum of scape and pedicel with white, semi-erect setae; clava without ventral micropilosity. **Mesosoma:** About $1.5\times$ as long as wide, in profile propodeum sloping at about 45 degrees. Pronotum short, about $3.0\times$ wider than long, without collar and sloping abruptly to occiput. Scutum with notaulus indicated by sculptured depression rather than distinct groove (Fig. 17). Scutellum as long as wide, moderately convex, without frenal line; scutellar flange barely perceptible (pits, if present, not visible at $200\times$); anterior margin distinctly truncate (i.e., axillae widely separated medially). Propodeal spiracle separated from posterior margin of propodeum by about $2.5\times$ its longest diameter; nucha indiscernible. Metafemur about $4.0\times$ as long as wide; metatibial spur with longer spur subequal in length to apical width of tibia, shorter spur about $0.5\times$ length of longer one. Forewing (Fig. 13) hyaline; costal cell asetose dorsally; ventrally with single setal row (3 setae) in apical third; basal and cubital veins asetose, basal cell asetose; speculum bare dorsally, closed to posterior of wing, ventrally

without setae; admarginal area nearly bare dorsally and ventrally; stigmal area asetose; ratio of submarginal vein:marginal vein:postmarginal vein:stigmal vein about 6:5:2:1; stigmal vein distinctly petiolate. *Metasoma* (Fig. 15): Slightly longer than head and mesosoma combined; metasomal tergum 1 (MT1, petiole) scarcely visible as transverse strip; MT2-4 apicomidially emarginated, MT5-6 entire (margins difficult to see because of color, translucency, and distortion); sterna difficult to interpret but ST2 appears to extend 0.5× to apex of gaster and hypopygium extends to apex; ovipositor sheaths slightly longer than body length, about 6× length of metatibia.

Male.—Body length 1.7–2.1 mm. As for female except: intermalar distance about 2× malar distance, which is 0.5× eye height; scape relatively larger and more laterally compressed (cf. Figs. 8 male, 9 female); F1-4 (and sometimes F5) anelliform; toruli about own diameter apart (Fig. 7); metasoma slightly dorsoventrally compressed (but distorted on all specimens), MT1 inconspicuous; MT2-6 slightly emarginated apicomidially.

Variation.—Females vary in length (excluding ovipositor) from about 1.7–2.5 mm. In most females, the ovipositor is greatly curled and thus impossible to measure, but in all except one specimen the ovipositor is obviously long as in the holotype. In one specimen, however, the sheaths appear normal and only 2.0× (not 6×) the length of the metatibia, but the ovipositor itself appears withered and distorted. This appears to be an anomalous, deformed specimen. The metasomal sterna of females is difficult to interpret because of the distortion and close association of sterna. All sterna are elongated toward the apex, with ST2 apparently extending half way to the apex of the gaster. The hypopygium definitely extends all the way to the apex.

In females F4 and in males F5 may appear anelliform even though they have placoid sensilla. In both sexes the gaster is poorly sclerotized and thus distorted so that it is difficult to judge tergal morphology. In both females and males the cubital vein, basal vein, and basal cell may contain one or two setae, but essentially the entire area from the speculum to the wing base is bare both dorsally and ventrally except for a few setae on the undersurface of the costal cell. The admarginal area is never as setose as in typical *T. comicus* (Fig. 12), though some specimens of the latter species are nearly as asetose as *T. tragicus*.

Type material.—Holotype ♀, Texas, Presidio Country: Big Bend Ranch State Natural Area: 1.7 mi NE McGuirks Tank, 29°29'N, 103°48'W, 4-IX-1993, E. E. Grissell, R. F. Denno, *Rhus virens* (USNM). Paratypes, 11 ♀, 4 ♂: Texas: Culberson Co.: 2 ♀, 3.6 mi S Pine Springs, old Guadalupe Pass Rd, nr. Guadalupe Springs, 5,200', 20-22-VII-1982, flowering *Acacia constricta*, G. A. P. Gibson (CNCI). Brewster Co.: Big Bend National Park: 4 ♀, Lost Mine Trail, 5,600'–6,850', 15-VII-1982, G. A. P. Gibson (CNCI); 4 ♀, 3 ♂, Maple Canyon, 5,200', 9-VII-1982, G. A. P. Gibson (CNCI, USNM); 1 ♂, 12.5 mi. SE Panther Junction, 2500', 23-26-VI-1982, G. A. P. Gibson (CNCI). Presidio Co.: 1 ♀, Ojito Adentro, 18.7 mi NE Rt. 170, 29°29'N, 104°3'W, 3-IX-1993, E. E. Grissell, R. F. Denno, *Phaseolus atropurpureus* (USNM).

Etymology.—From the latin *tragicus*, with reference to the tragically dull and boring appearance of the male of this species.

Host.—No host is known.

Distribution.—*Torymoides tragicus* is known only from western Texas.

Discussion.—Females of *T. tragicus* are nearly identical to those of *T. comicus*, and if it were not for the

inordinate difference in male scapes, females of the former would have been included in the variation section of the latter. Females of the two species differ in the following characters: In *T. tragicus* the first 3–4 flagellar segments are reduced (anelliform) (Fig. 9), whereas in *T. comicus* the first 5 flagellar segments are reduced (Fig. 4). [Males are similar but in *T. tragicus* up to the first 4 flagellar segments may be reduced (Fig. 8) and in *T. comicus* up to the first 6 (Fig. 3).] In *T. tragicus* the hypopygium extends to the apex of the gaster (Fig. 15), whereas in *T. comicus* it reaches only about three-quarters of the way (Fig. 1). Additionally, in female *T. tragicus* the surface sculpture on the lower half of the face is irregular being composed of slightly rimmed punctures each of which contains a seta; in *T. comicus* the face is evenly reticulate and the setae are not set in rimmed punctures [this difference can be seen with difficulty at 150×]. In male *T. tragicus*, the facial pits are not as distinct as in the female, but the two species are easily distinguished based on the unremarkable scapes of *T. tragicus* (Fig. 8), whereas *T. comicus* has the scapes enormously enlarged (Figs. 2–3). Additionally in male *T. tragicus*, the distance between the toruli is about a torulus diameter (Fig. 7), whereas in *T. comicus* it is about 2 diameters (Fig. 2). Both sexes additionally may be separated by the postocellar distance in *T. tragicus* (Figs. 10–11), which is about 3.5× the distance, but in *T. comicus* (Figs. 5–6) the distance is less than 2.5× the distance. The two also differ in the anterior of the scutellum, with *T. tragicus* being broadly joined to the scutum (Fig. 17) and *T. comicus* narrowly joined (Fig. 18). Although the distributions of these two species appear to overlap in Texas, it should be pointed out that of all collected specimens of *T. tragicus* and *T. comicus* only once were they taken together at the same time and locality.

Two females of *T. tragicus* were taken along with 7 males of *T. comicus* near Guadalupe Springs, Texas. Obviously males are easily told apart, but there might be some question as to the identity of females. The two specimens match the characters for *T. tragicus* discussed above, and I have no doubt that they are this species.

REVISED KEY TO NEARTIC
SPECIES OF *TORYMOIDES* WALKER
(AFTER GRISELLE 2005)

1. Forewing with setal rows of cubital and subcubital veins extending as far as posterior margin of speculum (Figs. 12—arrow, 13); area around stigma hyaline though a faint brown band sometimes present adjacent to stigma; postcellar distance greater than 2.0× ocellular distance (Figs. 5, 10); scape and legs either metallic green or white; female metasoma metallic green, brownish green, or pale yellow orange with black spots 2
- Forewing with setal rows of cubital and subcubital veins ending some distance before posterior margin of speculum (Fig. 14—arrow), and area around stigma (Fig. 14) stained brown for at least several stigmal vein lengths; postocellar distance 2.0× or less ocellular distance (Fig. 16); scape and legs (except coxae) reddish orange; female metasoma matte reddish orange (rarely reddish yellow), without spots *T. boucekianus* Grissell
2. Both sexes: flagellum apically wider than basally with 3 to 6 apparent anelli, at least F3 anellus-like and not longer than preceding segments (Figs. 3–4, 8–9); scape and legs dark or metallic green 3
- Both sexes: flagellum essentially filliform with 2 apparent anelli (as in Fig. 19) and F3 distinctly longer than preceding segments combined (Figs. 20–21); scape and legs (except coxae) white 4
3. Both sexes: scutellum (Fig. 18) anteriorly narrowed, axillae nearly meeting medially; notauli distinctly impressed as grooves; postcellar distance less than 2.5× interocular distance (Figs. 5–6); male: scape abnormally enlarged (Figs. 2–3) . . . *T. comicus*, n. sp.
- Both sexes: scutellum (Fig. 19) anteriorly broad, axillae not nearly meeting; notauli poorly indicated; postocellar distance about 3.5× interocular distance (Figs. 10–11); male: scape not enlarged

- (Figs. 7–8) though slightly laterally compressed *T. tragicus* Grissell, n. sp.
4. Both sexes: metacoxa and meso- and metasoma entirely metallic green; inconspicuous white setae present on dorsum of scape, dorsum of pedicel, and femora and coxae with longer white setae near apex; pedicel plus anelli shorter than first 2 funiculars (Fig. 12); cubital vein with 1 or 2 setae along posterior margin of basal cell *T. smithi* (Schread)
- Female: metacoxa, and meso- and metasoma non-metallic, pale with some combination of white, orange yellow, metasoma with one or more lateral spots; male pronotum white laterally, metasome white except for transverse median green band. Both sexes: conspicuous short, black setae present on dorsum of scape, dorsum of pedicel (Fig. 10), and femora and coxae with longer black setae near apex; pedicel plus anelli longer than first 2 funiculars (Fig. 10); cubital vein distinctly setose along posterior margin of basal cell (Fig. 8) *T. sulcius* (Walker)

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